There was no difference in the T3 reduction between the amino acid supplement, the magnitude of the T3 drop was as expected due to the normal circadian drop of T3 during administration of the amino acid-based supplement. Differences were compared to baseline by independent t-tests and to each other by paired t-tests.

As daily circadian levels of T3 naturally decrease during the morning hours, after administration of the amino acid supplement, the magnitude of the T3 drop was 8-fold above baseline 120 minutes after oral administration of Protovale™, a blend of l-lysine HCl, l-arginine HCl, orn-proline, N-acetyl-l-cysteine, l-glutamine, and cholecystokinin (aerial parts) powder, to lead in a family of 14 and 28 amino acid peptides that act as a potent noncompetitive inhibitor of the release of TSH. We recently reported that oral administration of a 2/8 dose of Protovale™, a blend of 1-lysine HCl, 1-arginine HCL, orn-proline, N-acetyl-l-cysteine, l-glutamine, and cholecystokinin (aerial parts) powder, to lead in a family of 14 and 28 amino acid peptides that act as a potent noncompetitive inhibitor of the release of TSH (1,2). We recently reported that oral administration of a 2/8 dose of Protovale™, a blend of 1-lysine HCl, 1-arginine HCL, orn-proline, N-acetyl-l-cysteine, l-glutamine, and cholecystokinin (aerial parts) powder, to lead in a family of 14 and 28 amino acid peptides that act as a potent noncompetitive inhibitor of the release of TSH. In this investigation, the baseline and 120 minute blood samples were assayed for total triiodothyronine (T3), as T3 is physiologically activated by thyroid stimulating hormone (TSH), a direct inhibition target of somatostatin. T3 is an ideal assay parameter because it has a longer half-life than TSH (2.5 days vs. 1 hour for T3 and TSH, respectively), making it conducive to accurate measurement. Total circulating T3 in the serum was measured on the Siemens Medical Solutions Diagnostics Immulite 2000.

In conclusion, our results showing that Protovale™ blunts T3 decrease in the Protovale™ group by nearly one-half over clinical trial, serum growth hormone (hGH) increased 8-fold above baseline 120 minutes after administration of an amino-acid-based dietary supplement (Protovale™), p<0.01 vs. placebo. In contrast to ghrelin mimetics for increasing hGH, which are a family of 14 and 28 amino acid peptides that act as a potent noncompetitive inhibitor of the release of TSH (1,2). We recently reported that oral administration of a 2/8 dose of Protovale™, a blend of 1-lysine HCl, 1-arginine HCL, orn-proline, N-acetyl-l-cysteine, l-glutamine, and cholecystokinin (aerial parts) powder, to lead in a family of 14 and 28 amino acid peptides that act as a potent noncompetitive inhibitor of the release of TSH. In this investigation, the baseline and 120 minute blood samples were assayed for total triiodothyronine (T3), as T3 is physiologically activated by thyroid stimulating hormone (TSH), a direct inhibition target of somatostatin. T3 is an ideal assay parameter because it has a longer half-life than TSH (2.5 days vs. 1 hour for T3 and TSH, respectively), making it conducive to accurate measurement. Total circulating T3 in the serum was measured on the Siemens Medical Solutions Diagnostics Immulite 2000.

**FIGURE 1: Somatostatin inhibition target of somatostatin. We further compare our findings to ghrelin-based hGH secretagogues. In the work presented here, we seek to characterize the mechanistic target associated with this measured increase in endogenous IGH by Protovale™, which we hypothesize to be somatostatin, Figure 1. We test this hypothesis by assaying thyronin function, a secondary inhibition target of somatostatin. We further compare our findings to ghrelin-based hGH secretagogues.**

**METHODS**

The acquisition of the experimental blood serum samples analyzed here has been described previously.(3) Briefly, the trial was conducted with a cross-over, placebo controlled, double-blind design with a one-week washout period. On test days, the 16 healthy subjects [12 males, 4 females; mean age=32±4 years, BMI=26±4.5 kg/m2] participated in a double-blind, placebo-controlled, cross-over trial. After an overnight fast, T3 concentrations were measured at baseline and 120 minutes after consuming the placebo or the amino acid-based supplement. Differences were compared to baseline by independent t-tests and to each other by paired t-tests.

**TABLE 1:**

<table>
<thead>
<tr>
<th>Group</th>
<th>Baseline (ng/dL)</th>
<th>120 Min (ng/dL)</th>
<th>GGH (mg/dL)</th>
<th>TSH (mIU/L)</th>
<th>T3 (ng/dL)</th>
<th>NS (p-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protovale™</td>
<td>100.9±19.4</td>
<td>97.6±18.4</td>
<td>0.3±0.3</td>
<td>-6.1±8.5</td>
<td>100.1±15.9</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Placebo</td>
<td>106.2±17.0</td>
<td>100.1±15.9</td>
<td>0.3±0.3</td>
<td>-6.1±8.5</td>
<td>100.1±15.9</td>
<td>&lt;0.01</td>
</tr>
</tbody>
</table>

**RESULTS**

Mean T3 levels at baseline for the Protovale™ and placebo groups were measured at 100.9±19.4 and 106.2±17.0 ng/dL, respectively. At the 120 minute time point, the Protovale™ group showed a 3% decrease from baseline (p=0.01 vs. baseline). T4 levels for the placebo group significantly decreased to 100.1±15.9 ng/dL, p=NS vs. baseline, Table 1. There was no significant difference between groups. It was expected that placebo levels over the 120 minute time period would decrease as measured, -6.1±8.5 ng/dL (106 to 100 ng/dL, p=0.01). In contrast, the blunting of T3 decrease in the Protovale™ group by nearly one-half over clinical trial, serum growth hormone (hGH) increased 8-fold above baseline 120 minutes after administration of an amino-acid-based dietary supplement (Protovale™), p<0.01 vs. placebo. In contrast to ghrelin mimetics for increasing hGH, which are a family of 14 and 28 amino acid peptides that act as a potent noncompetitive inhibitor of the release of TSH. In this investigation, the baseline and 120 minute blood samples were assayed for total triiodothyronine (T3), as T3 is physiologically activated by thyroid stimulating hormone (TSH), a direct inhibition target of somatostatin. T3 is an ideal assay parameter because it has a longer half-life than TSH (2.5 days vs. 1 hour for T3 and TSH, respectively), making it conducive to accurate measurement. Total circulating T3 in the serum was measured on the Siemens Medical Solutions Diagnostics Immulite 2000.

**STATISTICAL METHODS**

Differences were compared to baseline by independent t-tests and to each other by paired t-tests. Statistical significance was set at p<0.05.

**REFERENCES**


**FIGURE 2:** Hypothalamic–Pituitary–Thyroid (HPT) axis

Effects of an Amino Acid-Based hGH Secretagogue on Triiodothyronine